Flying Safety

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THIS ISSUE:
H FIRE-FIGHTING"

JUGGLING ACT

THE phrase "flying safety" can be misleading. Lift its shroud and you will discover an amazingly complex picture. Here is one aspect—the Air Materiel Command aspect—of that picture:

In many ways the development of today's fighting aircraft resembles a huge and complicated juggling act. Numerous factors are involved and each of them is intimately associated with "flying safety."

First of all, an aircraft must be designed for *operational fitness.* It has to be able to do the required combat job, and do it well, without pampering.

It must be as *simple in design* as we can make it —so that industry can mass-produce it, the ground crew can maintain it easily, and the air crew can fly it safely and efficiently.

It is important, too, that the airplane be *producible,* on a production-line basis, since this affects not only the number of airplanes that can be built but also the cost of each of them.

On top of all this, the airplane must be *reliable,* both for the pilot and for the mechanic. Maintenance today costs many times more than the airplane itself, and maintenance increases tremendously as the airplane becomes less reliable.

These and many other factors must be juggled and pieced together in this giant puzzle; the final product has to be an airplane that makes a minimum compromise with *tactical performance.*

But high tactical performance and safe flight are in delicate balance. Every time we decide to build a few more miles per hour into a new aircraft, a little more altitude, a few minutes more endurance, we have to keep close watch on the safety factor.

And so it goes. Considerations of safe flight enter most of our operations at Air Materiel Command. Reduced to its most common denominator, after all, *flying safety is nothing but efficiency of operation.*

When we work, for example, to develop new and easier ways to maintain aircraft, we are working for flying safety. An airplane that is tough to maintain is one that will not be maintained well.

When we plan for faster methods of keeping the supply pipeline open from the manufacturer to the using organization, we are also working for flying safety. A readily available flow of spare parts is necessary to keep operating groups flying safely.

Since the war, research and development advancements have been so rapid that it has been difficult to keep pace with them. We have been hard put to take full advantage of this compounding new knowledge. As the state of aviation art has taken its seven-league strides, problems have heaped high around our heads. Our most pressing problem: How can we keep airplanes simple enough that human beings can fly and maintain them?

More and more we are forced to seek ever-greater reliability in our equipment. For, unless we can provide that reliability, the burden of maintenance and of preventing accidents will be all out of proportion to the usefulness of the equipment. Each man added to the maintenance staff, or lost by accident, or assigned to help prevent accidents, is one less man available to our striking arms. Up goes the cost of defense, down goes our efficiency.

So you can see that the people of our Command —the people who design, develop, arrange for production, plan for emergency production, supply, and help maintain the Air Force's airplanes—are "up to their ears" in "flying safety."

The United States Air Force has a great abundance of aviation knowledge. Pooling that knowledge—getting it together in one place in a usable form—is a prime problem. It requires a free cross-exchange of information. The people who fly the airplanes we develop must give us the full benefit of their daily operational experience with those airplanes. We must work continuously to pool and put to effective use our tremendous knowledge.

When we reach that state, we will be well on the way to developing combat airplanes as safe and as foolproof as man can build them.

B. W. CHIDLAW
Lieutenant General, U.S. Air Force
Commanding, Air Materiel Command

CRASH FIRE RESCUEMEN

HOW THE SCHOOL AT LOWRY AFB TRAINS FIREMEN TO SAVE LIVES

AFTER a few hundred feet of the takeoff roll, the pilot of the F-82 was in trouble.

Despite desperate corrective action by the pilot, the plane veered off the runway, groundlooped and skidded across a concrete taxiway coming to a stop in flames.

The pilot managed to get out, but the radar observer sitting in the right cockpit was trapped when the canopy would slide back only a few inches. Frantically fighting the jammed canopy while flames licked around his feet, hands and face, the observer was beginning to weaken when he was rescued by Johnny-on-the-spot crash fire rescuemen, who pulled him from the cockpit and extinguished the fire within two or three minutes from the time of the crash.

The story behind this particular rescue, or for that matter any crash fire rescue, is a long one and goes way back to the first crash rescue school at Geiger Field, Spokane, Washington, during the early part of 1944. From here the story moves to Buckley Field and from there to Lowry AFB in 1946. The story concerns the training given USAF fire fighters and crash rescuemen at the only school of its kind in the world, the Department of Fire Fighting and Aircraft Crash Rescue Training.

Unprepossessing in appearance, the present-day school consists of two buildings situated in a corner of Lowry Air Force Base and includes a large area of fire-blackened fuselages of wrecked aircraft of all types. These wrecked aircraft, of course, have a significant role in the crash fire rescue training given airmen and civilian fire chiefs who attend the school from USAF bases all over the world.

The school faculty presently assigned includes a senior civilian instructor, Fire Chief C. W. Patterson, who has been in the fire-fighting business for some 26 years, and Major Louis F. Oliveri, School Operations and Training Officer. Both men are proud of the school and look upon their work as the best fire safety insurance against loss of lives and property in the USAF. Particularly the loss of life because, according to Fire Chief Patterson, only Lady Luck and a well-trained crash crew can help the individual who is trapped in the blazing wreckage of an airplane.

And since Lady Luck rarely takes an active part in extricating man from his unpredictable predicaments—such as aircraft crashes—this leaves the responsibility for rescue up to the crash fire crew, a rescue that is usually fraught with dangers to the rescuers, who carry out the mission under the most difficult conditions. The reward comes from the knowledge of a job well done and a human life saved.

The trainee going through this exclusive school receives both academic and practical work in aircraft crash rescue structural fire fighting techniques. "We stress cooperation to the nth degree," Chief Patterson said. "Students are taught that they are

(Left) Fire appears much larger at night. (Below) A student uses a carbon dioxide "playpipe". The lower photo shows the oxygen-equipped structural firefighter.

responsible for the rescue of each air crewmember, in the event of a crash fire on an Air Force Base. They are also taught," added Chief Patterson, "that aircrews are aware of the rescueman's ability and that the job held by an aircraft rescueman is one that calls for a highly trained man, the job being hazardous and extremely important, because in most cases human lives are at stake."

On every air base, preparations are made to fight two types of fires: 1. aircraft, and 2. structural, such as buildings. Each type requires a definite method of control or extinguishing technique. As a result, fire fighting and fire safety becomes a job for individual specified units. This specification is necessary because the two types of fire fighting differ greatly in many ways. The aircraft crash fire in almost all cases involves high octane gasoline, oil, broken fuel lines, hot ignition wires and bent and broken metal surfaces. In some cases the danger is increased by loads of bombs or ammunition. Combustion is sudden, flashbacks are common, and explosions are a constant hazard, even in training fires because gases fill wing cells which usually blow up when the pressure becomes too great.

These various hazards demand various methods of fire control, equipment approach, and removal of fire dangers. Special equipment is mandatory for an

In a hot fire the metal skin fuses and burns away.

efficient aircraft crash rescue. This equipment the crash crew has, and it includes special trucks designed for fighting various types of fires. Because special extinguishing agents such as heavy foams and carbon dioxide gas are limited for the crash crew, these agents must be conserved carefully and used strategically. Structural fire fighting, on the other hand, has in most cases an unlimited water supply from hydrants. For the crash crew the extinguishing agents are limited to the capabilities of crash trucks. And in the truck category, the class 150, one of the largest trucks used, carries 6000 pounds of carbon dioxide gas which can be discharged in approximately one minute when all discharge openings are utilized.

Speed and more speed is the by-word for aircraft crash rescue units. Speed in getting to the scene of the crash; speed in attacking the fire. "The lightweight metal skin of airplanes will fuse in less than 60 seconds when it is subjected to a hot, high-octane gasoline fire," Chief Patterson explained, "and delay in reaching a crash fire can endanger the lives of an entire aircrew trapped in an aircraft, besides the loss of property."

The school teaches the crash fire rescueman every detail of particular types of aircraft that have a bearing on his mission of personnel rescue and fire control. In order to do a good job, he must understand the airplane, its gasoline, electrical and oxygen systems and sometimes its ammunition and bombs. He is taught things about aircraft engines, wiring and oil systems, carburetors and firewalls.

In addition to studying the technical aspects of the fire fighting field and carrying out his routine work, the crash crewman must also keep in the pink of physical condition in order to be able to put forth the strenuous exertion required of him during a crash or fire that may occur at any hour of the day or night.

In learning the fire-fighting techniques, the trainee literally goes through an "ordeal by fire" for a period of eight rough and tough weeks. Starting out on a large economy-size practice fire of a couple of hundred gallons of high-octane gasoline, the students gradually progress and learn to bring under control within two minutes a large raging inferno of B-36 proportions.

As outlined by Major Oliveri, three courses are taught by the school. These are the Fire and Aircraft Crash Officer's Course, No. 13833, the Instructor's Course, No. 13832, and the Fire Fighting and Crash Rescueman Course, No. 13831. The school courses consist of 240 academic hours of instruction and approximately 100 fire demonstrations of simulated crash fires and engine fires on aircraft.

Dummies, representing personnel, are placed in crew positions within the wrecked aircraft and the wreckage then set afire after being saturated with hundreds of gallons of contaminated high-octane gasoline. Then, at a signal from Chief Patterson or one of the school instructors, the students are turned loose to control the fire and rescue the dummies representing the aircrew.

Since the student is gradually taught not to fear fire, the instructors sometimes are hard put, Chief Patterson said, to curb overconfidence in students, who actually become contemptuous of fire after they have learned how to use the various types of equipment. In spite of this over-enthusiasm among students, school safety records show that only three students during the past year suffered burns of any consequence.

An SOP is established usually for each type aircraft fire and this procedure is broken down into single-engine fires, twin-engine fires, 4 and 6-engine fires. The students are also taught the procedure for fire fighting under night conditions which is slightly different than day work. Fires at night

normally appear much larger than they do when observed during the day, and night operations of a necessity slow up operations of the crash crew.

Wintertime conditions also affect crash crew operations due to the extremely low temperatures that can cause water, and extinguishing agents largely composed of water, to freeze during an emergency. While water is the most common agent employed in fighting fires, it is used either as a straight stream, fog or in a foam solution when fighting a crash fire. Its use is best confined to foam and foam fog. Foam presently used by the Air Force is a composition of a concentrated protein base solution mixed in a foam generating nozzle with water and air. It has excellent smothering, cooling and holding qualities which make it the best agent now in use for fighting a large aircraft fire. Foam and water are incompatible agents and the two are not used together. When water strikes a blanket of foam, the foam is broken down quickly and disintegrates. The best possible combination of agents now in use is the foam with low-pressure carbon dioxide.

Single-engine aircraft crash fires are most easily extinguished and this type aircraft represents a major component of the Air Force. For each type aircraft from single-engine to six-engine, the crash fire rescueman is taught crew capacity and locations, power plant information, forcible entry points, canopy release locations, fuel capacities, oil-tank capacities, armament, battery locations along with a host of other factors about aircraft that have a bearing on rescue work. The initial procedure for rescue and fire control in any type of crash is usually a crash crew approach from the tail of an aircraft to avoid a hazard of fixed guns and to gain quicker access to any personnel that may be trapped within the fuselage.

A breakdown of crash fire statistics showed that in 245 accidents accompanied by fire, 816 individuals were involved. Seventy-five per cent of these persons sustained burns with or without other injuries and burns were considered to have been the primary cause of death in 13, or 2.3 per cent of the fatal cases. The hands and face were the most frequent sites of burns of those not fatally injured. And by the observance of fundamental precautions the pilot or crewmember can do his part toward helping himself and the crash fire crew, in the event of an emergency. Here are some of the rules which are not new, but are essential if the aircrew would help others to help themselves:

1. GET OUT!
2. Wear gloves and keep goggles and oxygen mask handy, or, better yet, leave them on while landing or during emergency conditions. Do not roll up your sleeves or fly without a shirt.
3. Fire bottles and fire axes in planes are put there because equipment is useless if the aircrew doesn't know where it is or how to use it.
4. Crewmembers should not leave their assigned for fire protection. Keep familiar with these things positions during takeoffs or landings. The crash fire rescueman is a mighty busy man in an emergency; he knows where the crewmember *should* be on a particular type airplane and if he is not there, the rescueman has little time to search for him.
5. Do not smoke in restricted areas or near aircraft refueling operations.
6. If it is at all possible, a pilot making an emergency landing on an airbase should inform the tower, for relay to the crash fire crew, the exact location of his intended touchdown.

By the observance of these few simple rules and maintaining the ordinary precautions of fire safety, both in-flight and on the ground, the aircrew, by continuous training in emergency procedures and proper air discipline during every flight, can do their part in helping the crash fire crew reduce the number of fatal and non-fatal burn injuries resulting from aircraft crash fires. (U)

BEN H. NEWBY

Fire dies quickly in a "snowstorm" of foam agent.

A "rescue" is made under a blanket of foam solution.

Tools of Research

AERONAUTICAL ENGINEERS EXPLORE FAR BEYOND THE REALM OF TRANSONIC FLIGHT

SIGNIFICANT accomplishments have marked the past year in the progress of man-made flight. Today, while still coping with the admittedly difficult problems of transonic flight, aeronautical research is simultaneously exploring far beyond that region. A new label—"hypersonic" has come into use to describe speeds more than five times the speed of sound, and facilities are becoming available that permit detailed studies to be made of some of the problems encountered at such speeds.

In the realm of actual flight, research airplanes have repeatedly flown above Mach number 1, while missiles have flown up to Mach numbers of about 5.

Where does aerodynamic research, which seeks to determine the most efficient shapes or forms of wings, tails, control surfaces, bodies, and other component parts of the airplane or missile, fit into this picture? What have been the contributions of the aerodynamicist to the general progress?

Since 1915, the National Advisory Committee for Aeronautics has engaged in the scientific study of the problems of flight. From this research has come a steady flow of data to assist the aircraft industry and the military services. Research is being conducted in aerodynamics, propulsion, aircraft construction, and operating problems. The bulk of this work is conducted at NACA's three major research centers, the Langley Aeronautical Laboratory at Langley Air Force Base, Virginia, the Lewis Flight Propulsion Laboratory at Cleveland, Ohio, and the Ames Aeronautical Laboratory at Moffett Naval Air Station, California.

The Ames Laboratory recently held its 1950 biennial inspection during which representatives of the Armed Services, other government agencies and private industries were afforded the opportunity to inspect the laboratory and to observe the work being conducted there.

Competition, both military and commercial, dictates increased airplane performance. But it would be costly to a dangerous degree to accomplish this by increased power alone—by brute force, as it were.

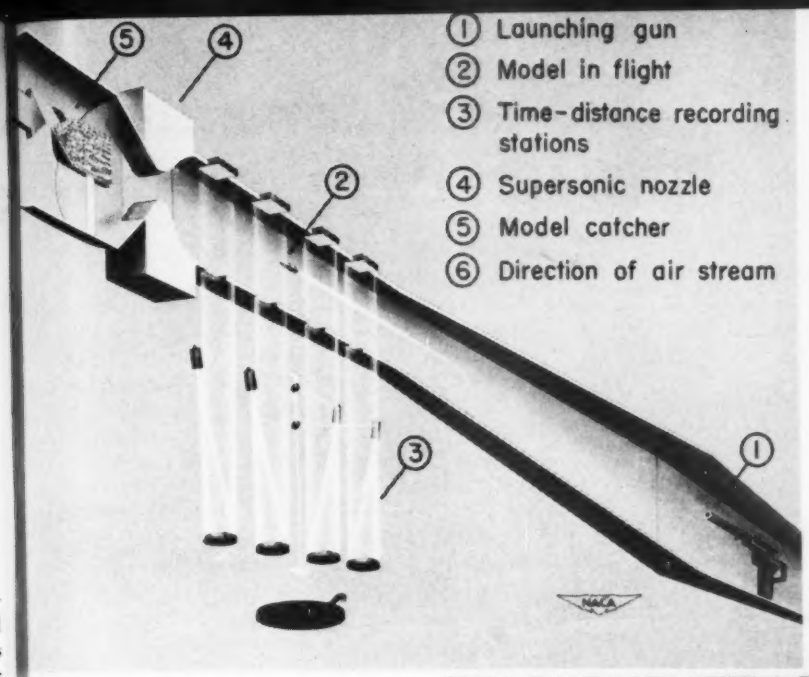
The alternative is to obtain improved performance with more efficient aerodynamic forms, combined with more powerful and efficient propulsion systems and fuels. This has been done at lower speeds in the past and has been a potent factor in aviation progress.

It appears that aerodynamic progress in the transonic and supersonic speed regions is paralleling the rate of progress made in the lower speed regions. If higher speeds are obtained by improving the efficiency, the return is gratifying. Military aircraft will be less costly to operate or, alternately, will be able to travel farther, carry more military equipment, operate within greater margins of safety, and hence be more effective.

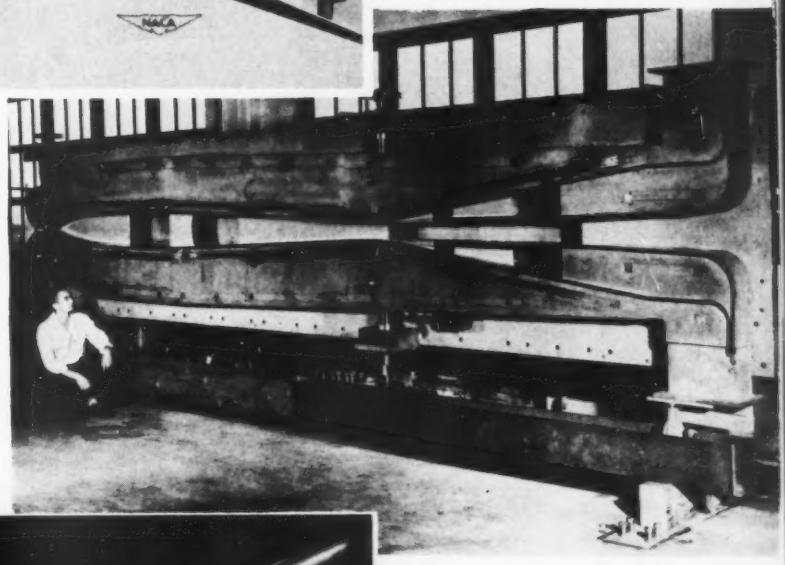
In the light of this, what are the outstanding problems that are being studied today?

From the research standpoint, a number of the problems are old and familiar; they have merely assumed new aspects and rearranged themselves in importance. For instance, air inlets must operate over a wider range of speed and flight conditions. They must operate with less loss and handle from 10 to 20 times more air. The allied problems of internal air ducts and jet engine exhausts have changed correspondingly. In every respect, internal aerodynamics research has assumed an entirely new order of importance.

The old problem of buffeting increases in complexity and seriousness near sonic speeds. The solutions are no less elusive and the problem threatens.

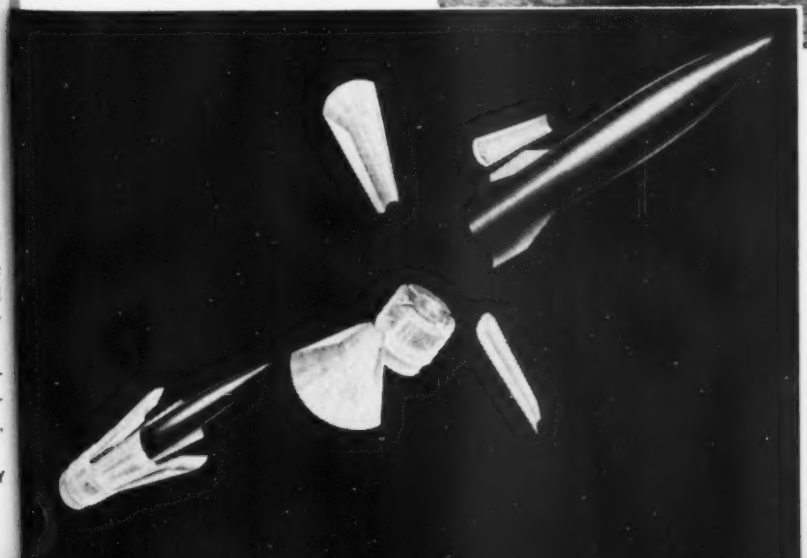


LEFT. Cutaway drawing explaining the major operating features of the new supersonic free-flight wind tunnel at the Ames Aeronautical Laboratory of the NACA. Fired from guns at one end of the wind tunnel, models fly through an air stream speeding in the opposite direction. This tunnel has already been operated at eight times the speed of sound and has a potential of 15 times sonic speed, equivalent to about 11,000 mph at sea level.



RIGHT. The upper and lower nozzle of the new 10- by 14-inch supersonic wind tunnel at the Ames Aeronautical Laboratory of the NACA. One side plate has been removed to show (from left to right) the supersonic nozzle, the test section where models are mounted, and the converging and diverging passages of the diffuser, as well as the boundary-layer scoops which help stabilize the flow of air out of the diffuser.

BELOW. Models launched from guns in the new supersonic free-flight wind tunnel at the Ames Aeronautical Laboratory of the NACA are protected in the gun barrel by plastic "sabots" which keep the models correctly aligned and act as pistons on firing. This drawing shows what happens when the model leaves the gun muzzle. Note how the sabot separates and falls away, leaving the model free to continue its flight through the test section, where measurements are made.



in some cases, to limit airplane performance. Propellers, in new forms, are promising high-speed performance with wide ranges of efficiencies but problems long associated with them remain to be solved.

Despite the radical changes in wings that have occurred in recent years, much remains to be learned to arrive at the most efficient forms for the wide ranges of speeds required of new airplanes. Demanding even more intensive research, however, are control surfaces. The problem of making them effective at all flight speeds, and of making their force and speed characteristics compatible with piloting capabilities, is one that is requiring multiple approaches and highly imaginative investigation techniques.

Especially important among the problems of high-speed research is the relation between aerodynamic loading and the elastic properties of the aircraft structure, where load changes induce structural deflections and vice versa. Aeroelasticity, as this phenomenon is called, is an important consideration in the design of swept wings and there is an urgent need for basic information on the subject.

Problem of heating at high speeds, of skin friction at very high speeds, and of the effect of shape at high Mach numbers, are receiving attention because they will become of practical importance in the future.

These and many other problems are being attacked in the Laboratories of the National Advisory Committee for Aeronautics, a Government agency which conducts scientific investigation of the problems of flight, with a view to their practical solution. To this end, the NACA uses all of the tools of research—wind tunnels, aircraft (including the very latest research airplanes now being flown at Edwards Air Force Base at Muroc, Calif.) engines, rocket-propelled models, etc. Its principal product consists of technical reports of various types. Once a problem is attacked, the job is not finished until the results are analyzed, a satisfactory explanation is obtained for the controlling factors, conclusions drawn, and the whole accurately reported. Thus, ideas, design data, and all available advances in the knowledge of a problem are made available to the armed forces and the aircraft industry in the form of technical reports, which act as guide posts in the creation of the airplanes and missiles of tomorrow.

One of the major premises in the elimination of aircraft accidents is the construction of safer aircraft. To accomplish this end, aircraft design must be based on sound engineering principles as determined by research. (U)

SUPERSONIC PROPELLERS

RESEARCH leading to the design of a new propeller which gives promise of improved efficiency and greater range at flight speeds of from 500 to 700 miles per hour has been reported by the Ames Aeronautical Laboratory.

Prior to actual flight, further aerodynamic research and industry development must find solutions to problems involving vibration and flutter. Such studies are being pressed at the Ames Laboratory and the NACA Langley Laboratory, as well as by other research groups, the military services and propeller manufacturers. There is reason to believe that further raising of the practicable upper speed limits for airplanes powered by turbo-props may be accomplished.

This new prospect for propellers is the result of abandonment of efforts to keep subsonic the speed of propeller blades through the air. As a result, the new propeller is termed "supersonic," in that all parts may travel at speeds above the speed of sound, even though the airplane is flying at subsonic speed.

It was pointed out that as early as the 1920's, loss of propeller efficiency from compressibility effects at the blade tips was observed. To reduce these losses, engines were geared to rotate the propellers more slowly. This in turn required larger propellers, and the increased diameter necessitated even greater reduction in the rotational speed of the propeller.

In addition, blade angles became so large that too much power was wasted pushing the air around with the propeller instead of propelling the airplane forward by pushing back on the air. These limitations were such that propellers could not compete with turbo-jet engines at flight speeds much above eight-tenths of the speed of sound.

The new supersonic design uses smaller blade angles and very thin blade sections compared to the older type. Also, because of its higher rotational speed, the supersonic propeller need have only half the diameter of a subsonic propeller for the same power, and this permits important savings in the weight of the propeller and drive gearing. It also permits a shorter and lighter landing gear for the airplane.

On the other hand, the extreme thinness of the new propeller blades has intensified the problems of vibration and flutter, which were limiting factors even with the thicker subsonic blades. But laboratory research has shown that proper selection of blade width can help prevent flutter. (U)

OCEAN WEATHER STATIONS

OVERSEAS FLIGHTS MADE SAFER BY ACCURATE WEATHER FORECASTS

PRIOR to 1940, merchant ships radioed on-the-spot weather data to the Weather Bureau. Forecasts and warnings were then made; however, with the outbreak of World War II in Europe, this service was necessarily curtailed.

In 1940, the United States Coast Guard instituted weather patrols using their cutters as observation stations. Toward the end of the war there were 11 Coast Guard ocean stations in the Atlantic and five in the Pacific. After cessation of hostilities in 1945, these were drastically reduced.

The post war increase in commercial and military transoceanic air travel raised the need for the continuance of the program, and at the International Civil Air Organization meeting in Dublin, Ireland, in 1946, an agreement was reached whereby 13 ocean weather stations would be maintained in the Atlantic and eight in the Pacific. These stations were to be maintained on a pro-rata basis by the various countries that have scheduled airlines using the facilities. The participating countries are the United States, Canada, Great Britain, Netherlands, France, Norway, Belgium, Denmark, Sweden, Ireland and Portugal.

The duties of the ocean stations for which the United States is responsible has been taken over by the Coast Guard. While the main reason for the patrols is radioing weather observations every three hours to Coast Guard Station NMH at Arlington, Virginia, they also provide transient aircraft with check points since each holds a position at a published latitude and longitude. Search and rescue are also among the duties performed by these ships.

From four to six United States Weather Bureau meteorologists accompany each American patrol ship. Life aboard the relatively small vessels is lonely and trying with eating and sleeping, and even such a simple recreation as a game of checkers, made difficult by the tossing of the ship in the high running seas. The stations in the northern latitudes often have long periods of squally weather. Yet, because theirs is among the most difficult of all assignments, as well as a vital necessity to ocean flying, crew members have an esprit de corps that is seldom matched.

Air Force and CAA forecasters in the areas served by these cutters are able to give more accurate reports as a result of this service, and what was once an unknown area on the weather map is now an airway intersected by isobars. (U)

On Guard

PRIDE IN THE ORGANIZATION IS A DISTINCT CONTRIBUTION TO SAFE FLYING

EXCEPT for the spirit, there was little similarity between the 116th Observation Squadron at its summer encampment in 1925 and the 116th Fighter Squadron on maneuvers a quarter of a century later. But spirit is what can carry an outfit at top proficiency from Jennies to jets.

Both times it was a voluntary local organization of citizen-airmen maintaining and flying airplanes. Back in 1925 the men talked about tailskids, spreader bars and artillery adjustment. This year the talk was about tailpipe temperatures, aileron boost and radar-directed interceptions.

To the tradition of the 116th Air National Guard Squadron at Spokane, Washington, has been added a new experience which strengthens that spirit. The unit was one of 12 outstanding Air Guard squadrons awarded the Spaatz Trophy during field training this year. The awards are made annually, nationwide, on a basis of general efficiency and readiness, including safety and flying records, maintenance of unit strength, equipment and esprit de corps. What this means is that the 116th has measured up to the goal of all Air National Guard units—to be capable, without clashing gears, of meshing into one powerful defensive machine with the regular USAF.

It also means that the citizen-airmen have made personal sacrifices to be as ready as the minutemen of Lexington and Concord. Although substantially the same training standards were set for the USAF and the ANG, the guardsmen's drill periods allotted about one-sixth of the time available to regulars to accomplish this large order. Of course this time differential should not be taken at a glance. The goals set were minimums, and the USAF on full time was expected to exceed these minimums and perform other missions as well.

The 116th Fighter Squadron gets down to business when it meets in the evenings or on weekends. Its insignia, an ace of spades pierced by a stiletto, is a challenge. As the unit's commander, Lt. Col. Frank W. Frost, explained: "It means, 'Let the enemy beware,' a good device since it keeps us always thinking that our training is for combat. And anytime you set yourself up as a challenger, you're going to do everything possible to keep yourself in shape."

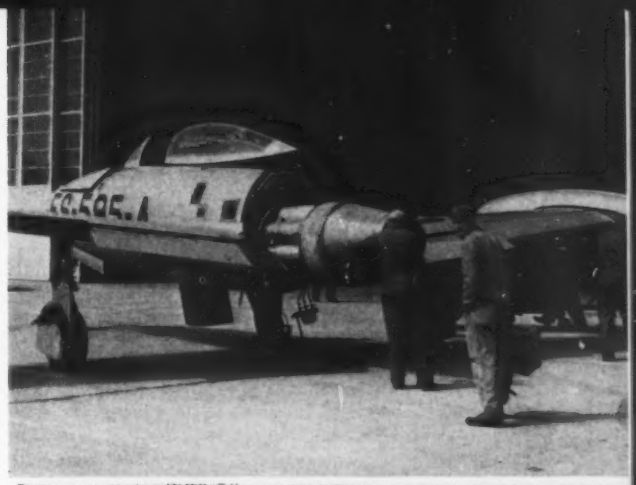
Colonel Frost and a score of the airmen on the

squadron's present roster were members of the 116th before World War II. Both Colonel Frost and the unit's present USAF instructor, Maj. Samuel C. Gracio, enlisted in the squadron in 1936, later qualified for flight training. So it is easy to see that the supervisors of the outfit are no strangers to the problems of recruiting and training volunteers. Pride in the organization keeps men in, keeps them working and boosts efficiency. And the way Colonel Frost looks at it, the best way to help a man feel like a member of the team is to give him an opportunity to use his natural talents and learn new skills. The 116th mail room handles a large volume of correspondence course enrollments. Air Force and National Guard letters and regs are continually consulted for school opportunities for officers and airmen. Airmen attend USAF engineering and radio schools while officers take their turn, when they can leave their civilian jobs, and attend such courses as those provided by the USAF instrument school and the Air Tactical School. When they return to the squadron they get jobs where they can step up the over-all training level.

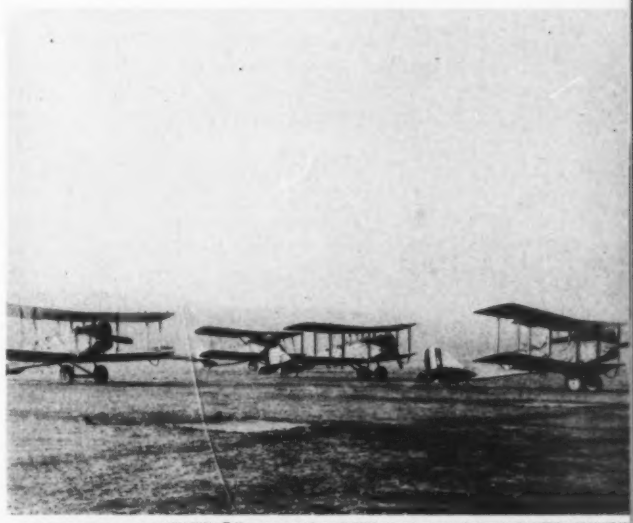
This alertness to training opportunities shares credit for the squadron's record of safe flight. It had been more than a year, 380 days to be exact, since the squadron had chalked up even a minor aircraft accident, when an incident occurred which might have been tragic. Lt. Lloyd Howard was returning from a ground controlled interception mission during operation "Whipstock" when the engine of his F-51 failed internally and caught fire. He was near the field, so he cut all switches and made a deadstick landing on the first third of the runway. As he rolled to a stop, he turned the plane 90 degrees to the prevailing wind and crawled out of the cockpit on the upwind side, escaping the flames. A very efficient Naval Reserve crash crew quickly extinguished the fire, saving the airplane. The engine was sent to a depot to determine the cause of the failure.

Geiger Field, which serves jointly the Air National Guard, the Naval Air Reserve and the City of Spokane as an airport, is typical of many Air National Guard operating locations. Cooperative planning by the various agencies using the field pays off, as it did in the above emergency. Close liaison is maintained between the CAA operated control tower and the fighter squadron. The squadron gave tower operators briefings on military aircraft landing and takeoff problems and furnished them with jet takeoff distance charts as an additional safety factor.

As a fighter squadron using F-51 aircraft, the



Airmen of the 116th like the way jet planes open for inspection. 1950 summer maneuvers were held at home station, Geiger Field.



In 1925 the guard squadron flew DH-4 aircraft at encampment. Greatest interest was in new Douglas O-2, shown in background.

116th's proficiency was high enough that the squadron was selected among the first National Guard units to change over to jet fighters. Colonel Frost received word on 27 February 1950 that his outfit would be equipped with F-84 Thunderjets. The squadron lost no time in setting out to learn how to maintain and fly the jets.

In April, the squadron received its first F-84C fighters, the first National Guard squadron west of the Mississippi to be given the Thunderjet. Five officers and 20 airmen had attended an F-84 transition school at Shaw AFB, and were ready to assist the other squadron members in mastering the new techniques, when the planes arrived.

All mechanics and pilots attended classes conducted by the F-84 detachment of the 2397th Mobile Training Squadron, sent to Geiger from Chanute AFB. An individual training record was set up for each pilot and mechanic, to keep track of his progress in becoming familiar with the new aircraft. In support of the squadron training program, representatives from Republic and Allison aircraft and engine plants were on hand during the first flights to assist in solving problems as they developed.

Only after the pilot completes his ground schooling on engineering, armament and gunnery, problems of high speed flying, jet cruise control, personal equipment, flight planning and communications, and attends the altitude indoctrination course at Mather AFB, is he given an opportunity to start flying the jet.

Thorough indoctrination is given each man on methods of making visual pre-flight inspection and cockpit checks. Then, he is required to demonstrate to his instructor his familiarity with all normal and emergency procedures, explaining the operation of the J-35 engine, describing hydraulic and electrical systems and emergency procedures for each. This careful supervision is carried even farther. Before a 116th pilot is given the "go ahead" to taxi out in a Thunderjet for the first time, he has to get thoroughly acquainted with the cockpit. After four hours of cockpit rehearsal, he must pass a blindfold test. Only then will his instructor-pilot give him the "go ahead" to make a flight.

On each flight the pilot has a card guide to the various maneuvers he must do on the transition mission. The cards have blank spaces where the pilot records various readings from the aircraft instruments. This, the USAF Air Training Command has found, speeds the learning of aircraft operating limitations, and teaches the pilot to be exact.

Transition flights are devoted to familiarization with the effects of various altitudes and power settings on fuel flow and tailpipe temperature, the flight characteristics of the airplane with aileron boost off, formation flying and high altitude flight, placing emphasis on proper use of oxygen equipment. Jet navigation is introduced on round-robin flights and cruise control receives the greatest emphasis. When the above has been accomplished, the pilot gets an opportunity to do what he has been itching to do—take 'er up and wring 'er out! (within limitations, of course). Three hours are allotted to acrobatics. When the pilot is checked out, he will have flown at least 14 missions and 29 hours in the Thunderjet and if he has met these tests, the MOS 1059, Jet Pilot, is lettered opposite his name on the squadron ready board. After the check-out the pilot soon discovers that he has just begun to be a jet pilot. The most important phase of his training is ahead—the tactical application of the jet fighter. (U)

Maj. General Earl S. Hoag, Special Assistant to the Chief of Staff, presents the Spaatz Trophy to Lt. Col. Frank W. Frost, Commanding Officer of the 116th Fighter Squadron, outstanding unit in the 60th Fighter Wing commanded by Brig. General H. R. Wallace, left. General Wallace once served in the 116th. Colonel E. E. Evans of the National Guard Bureau is on the right.

the lucky 13

PARACHUTE DRILL SHOWS WHY BRIEFINGS ARE REQUIRED

WONDERINGLY, the 13 sweating airmen volunteers followed the pilot and copilot up the improvised ramp and through the wide cargo door of the C-47 to take their individual choice of a hard, bucket seat. They were a representative group of airmen from private to master sergeant and all but one had flown as passengers in military aircraft.

When all were seated, the pilot told them why they had been asked to board the airplane:

"We are going to conduct a couple of tests," he explained, "a dry run to find out just how fast you men will be able to get into your parachutes and bail out of this plane under simulated emergency conditions. There are the parachutes in the rear of the plane." The pilot paused while the 13 volunteers eyed the stack of 15 'chutes, and then continued.

"We are going to have a mock emergency of fire in the right engine, and when I give the signal to bail out, each one of you grab a 'chute, get into it as fast as you can and bail out just as you would if it was a real emergency in flight. The test will be timed and after you're out of the plane, don't make any adjustments to your 'chute until you're inspected. Does everyone understand?" Heads nodded affirmatively.

"For your information," broke in the copilot, "during an intense fire in the engine, the wing of an airplane can burn through in less than two minutes."

Shattering the brief silence that greeted this grim bit of information, the pilot's shout of, *"Fire! Bail Out!"* electrified the 13 airmen into a stampeding rush for the stack of parachutes.

Ten minutes later the results of the test were assessed and noted as follows:

1—In a dead heat, with 'chutes on and adjusted correctly, two of the airmen emerged from the jump door in 35 seconds.

2—A third airman was off in 40 seconds.

3—Five airmen off in three minutes.

4—Two men off in four minutes.

5—Three airmen were still aboard at the end of five minutes.

Two of these airmen still aboard couldn't solve the intricacies of the harness and were not even halfway into their 'chutes. One of these men was the man who had never flown. The third man, who had on several occasions hitch-hiked by military airplane, managed to fasten the breast buckle of his 'chute harness, but was still searching for the leg straps after five minutes.

With everyone out, the airmen were lined up for an inspection of their parachute fittings. Of the men who had managed to "bail out" of the plane, three had fastened only one leg strap because they were tangled or adjusted to a small size; one man failed to fasten either of the leg straps, another airman failed to fasten his breast buckle, while another volunteer, stuck with a small size 'chute and barely able to fasten his leg straps, hunched over in a weird-crab-like appearance.

After this inspection, the 13 men were assembled and given approximately five minutes group instruction on the fitting and adjustment of parachutes. An extra two minutes' instruction was given individually for those who still seemed to have trouble getting into their 'chutes. The volunteers were then again seated in the plane with their parachutes off, but serving as back cushions in the bucket seats.

Again the signal was given to bail out, and this time the airmen sprang into action, put on their 'chutes and were off the plane within 55 seconds. The following inspection showed that the parachutes were properly fastened and adjusted. All but four of the men were off in less than 32 seconds. Significantly, in both tests, the last men off were using the quick-release type 'chutes. The first men off had the snap-buckle type, while the 'chutes used by the middle men had buckles of the bayonet type.

Obviously, these volunteer airmen were the

"lucky 13," because the tests were conducted under ideal conditions of no real emergency. There was no panic, no flight conditions, and the plane was perfectly stable. Had the plane been in flight, the sudden shift of weight to the rear and the ensuing scramble and rush for parachutes would have radically and quickly changed the center of gravity of the aircraft. Perhaps the pilot would be able to correct the faulty shift and perhaps he might not. The introduction of spinning forces produces radial G forces. Even the most perfectly conditioned athlete is unable to move more than two to three feet against three radial G's. Faced with an emergency in flight, these men might have become the "unlucky 13" from the lack of a short briefing on the use and adjustment of the parachute.

The results of the first test bear out flight safety records, which show that during the period 1 January 1946 through 1 January 1950, 1080 emergency parachute jumps were reported, resulting in 112 deaths and 354 injuries. One jump out of every ten is fatal. By contrast, trained parachutists have less than one per cent of their personnel killed or injured in jumps. These statistics stand out even more when compared with the simple and inescapable fact that a high percentage of the personnel involved in the emergencies simply didn't know how to use their 'chutes; to adjust and get into them fast enough after the emergency arose.

It is not uncommon to stand in the operations building of almost any USAF base and see potential fatalities set up as crews with passengers stroll calmly through the door, crawl into the cabin of cargo aircraft, slam the doors, start the engines and proceed to take off. Examine the next cargo or passenger airplane you fly in and see where the parachutes are packed, how neatly the straps are stored —by locking the snap fasteners together or by inserting bayonet connections. Then, picture this aircraft in a slight dive or descending spiral, men rushing madly uphill, falling over shifting baggage, untangling parachutes and generally attempting to put them where they should have been long before the emergency.

A study of parachute jumps over the last four years indicates that while getting the 'chute on and getting clear of the airplane is a very serious problem, over 80 per cent of all injuries associated with emergency bailouts result from landing impacts by men who have never been given adequate training on how to maneuver and land in a parachute jump.

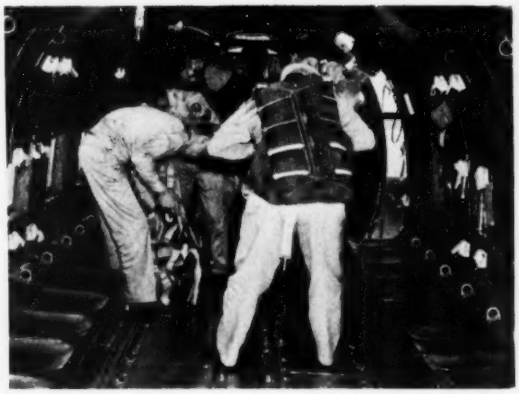
Not only is it necessary to show men how to put parachutes on, to have their 'chutes selected and at least pre-fitted, it is also of vital importance to be sure they know how to operate the emergency release handles on the emergency escape hatches and cargo doors. Imagine a man unfamiliar with emergency procedures, flying at night in the back end of a B-25 . . . The electrical system gone off, which will be typical of an emergency condition, no flash light and no way to find the hatch.

Passengers must be briefed on how to use and adjust the parachute and get out of an airplane. Even rated personnel who are checked out and familiar with the different type parachutes run into trouble when an emergency allows too little time to locate and adjust a parachute. For your safety's sake, wear your 'chute during flight. If you have to remove it to perform certain duties, keep it ready to put on at once.

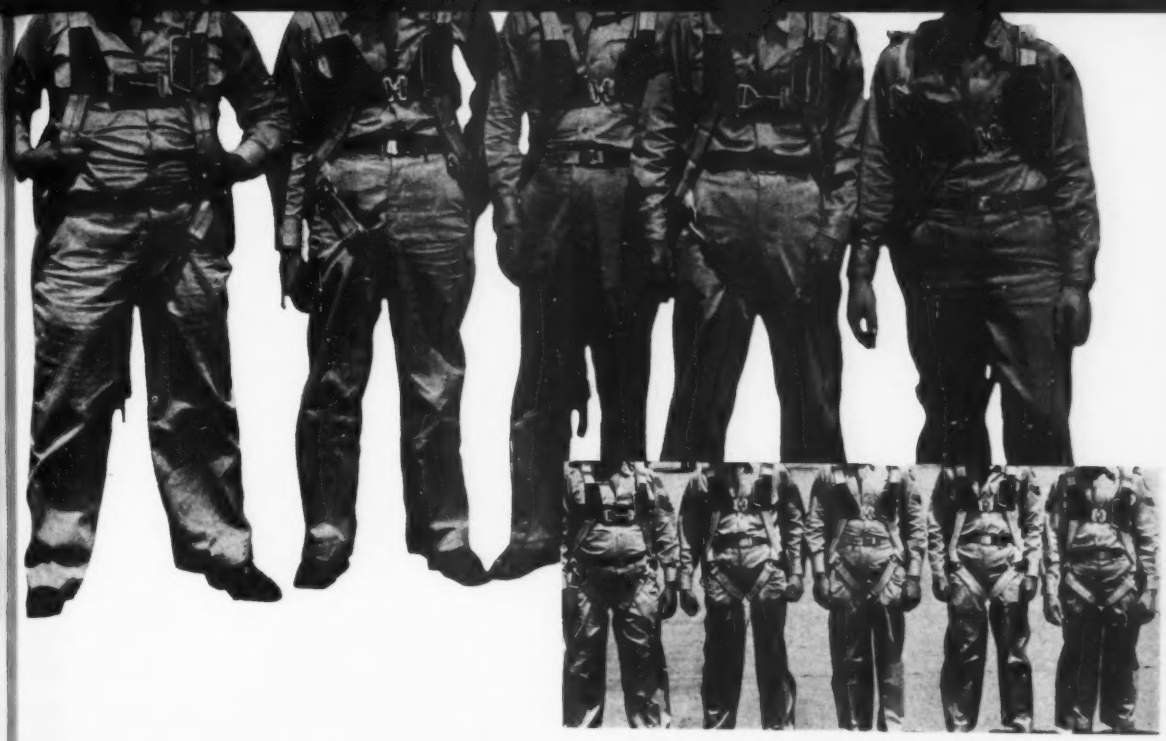
In an emergency there is little time, and that is the stuff life is made of . . . don't waste it.

• • • • • • • • •

Someone has suggested the dramatic possibilities of using a similar situation as this parachute drill as a flying safety lecture—using a stage to reconstruct the arrangement of a cargo airplane.



Above, the stack of chutes in the rear of the plane. Below, the bail out order has been given and the men fumble with the chute straps and buckles.



Above, a before-briefing shot shows a grim lineup of "casualties". An inspection shows that three men had fastened only one leg strap of their parachute; one man had no leg straps fastened, while another airmen's chute fitted loosely. Below, left, a sergeant puzzles over which strap goes where on a quick-release type chute.

Below, right, the first man off of the plane would have been a casualty because he failed to fasten the parachute chest straps. In the inset above, the men are lined with their parachutes properly fitted and adjusted.

STRAIGHT

USAF C

A MAN who can drive one kind of automobile can hop into any other make and, without even asking if there's enough gas, immediately whip into traffic and be on his way. Not so with airplanes. While basically they're all the same, they can't be flown safely and efficiently until the crews get some special educational pointers. This is especially true of the big ones—four-engine modern transports.

"We start with thoroughly trained airmen," Chuck Mercer, Head of Lockheed's Flight Training, says, "but we have to transition them to fly the C-121's (Constellations)." That "transitioning" is quite a thing, too. It's not only a technical problem but in many cases a psychological one, as well. For various temperaments, Lockheed's flight training experts have a "match-man." For instance, if the pilot who is being "transitioned," is an excitable gent, he is given an instructor whose nerves are as solid as Gibraltar and who can be as phlegmatic and relaxed as a Galapagos turtle. But for the young man who has logged lots of hours flying military craft and who is a "hot pilot," a young severe, spit-and-polish instructor takes over. And, the records show, this personality choice system has proven a huge success at Lockheed.

Perhaps the most difficult training problem is convincing airmen who think they don't need training to realize that they do. It involves the too-experienced airman; the fellow who was flying when the instructor was no more than a kid in rompers, and who doesn't want any young whippersnapper to tell him he should change his air habits. To fly the big airplanes of today, he must understand and accept today's proven techniques. And getting him to do it with a minimum of conflict is a diplomatic chore of the first water.

Sometimes it is necessary to induce "controlled emergencies" to make the trainee realize that he may have been A-plus in his twin-engine job but that he has a bit more to learn about the complexities of today's modern four-engine planes, the Constellation, for instance. Maybe it proves to be a good

ROM THE HORSE'S MOUTH

NSITION IN NEW PLANES AT FACTORY

idea, when the training airplane is coming in for a landing, to say nothing at all when the trainee-pilot fails to see that the landing gear has not locked into position but is "dangling," until he is about to set down. Then, quietly, the instructor points out what could be a fatal error and takes the plane around again. This time the student makes sure the gear is properly locked, and chances are ten to one the flier will re-examine himself and his experience and submit gracefully and gratefully to the training.

The Lockheed boys use charts, slides, graphs and mock-ups to get their points across, but they all agree that the check-list is the guts of the program. "If the crew uses the check-list properly, it's pretty hard to get into trouble," the boys say. The entire crew participates in the C-121 cockpit checks, with the flight engineer making most of the answers. The number of items on the check-list is divided this way: Before Starting Engines, 51; During Warm-up and Taxi, 12; Before Takeoff, 16; During Climb, 11; Before Landing, preliminary, 12; Before Landing, final, 6; After Landing, 5, and After Parking, 8. Only after all of these things are taken care of, can everybody go home.

One interesting feature of the training program is the mock-up of the Constellation in which the training crew sits while all manner of conditions are simulated. Engines catch fire, hydraulic systems go haywire, and a variety of other emergency conditions are indicated by flashing lights, honking horns and other signals in the cockpit. Normal flight operations and conditions are worked on, too, until dealing with all these things becomes almost second nature with the crew.

All this adds up to the proof of maturity in today's airplane business. The flight training experts are not concerned with the so-called glamour of flying, for aviation is not an aerial hot-rod paradise anymore. They want the crewmen to die in bed, of old age, and they labor earnestly to induce in everyone who has anything to do with flying machines the prime necessity for safety first. (U)

GO

By CAPT. DAVID F. McCALLISTER
142nd Fighter Squadron
Delaware Air National Guard

SINCE the inception of the Air National Guard there has been a constant need to stimulate interest in flying weather in single-engine fighters. It is imperative that fighter pilots become proficient to the point where they can climb through three thousand or 30 thousand feet of overcast to seek out and destroy any and all aggressors and then return to their home base safely. You can bet your bottom dollar that any aggressor bombers attacking this country will not pick a sunny, CAVU day.

There is no place in our air defense set up for a fighter pilot who is not the master of his aircraft, regardless of weather. There is no "bugaboo" to flying weather in fighters, nor does it take anything but a normal amount of ability. It does require initiative on the part of each fighter pilot to begin thinking weather, studying and practicing procedures and then flying weather at every opportunity.

One requisite to be reckoned with before undertaking weather flight in your fighter is good physical condition. It is imperative that you get adequate sleep the night before and abstain from the use of alcoholic beverages 24 hours prior to flight. It is a little too late to get that eight hours sleep or to practice abstinence when you're holding in the middle of a stack at 6000, befuddled by fatigue or confused by vertigo.

Develop a healthy respect for weather. Know the capabilities of both yourself and your airplane, and stay within these limitations. If your weather flying experience is limited, improve your technique in the Link and under a hood before tackling the murky gray. Then advance to actual weather flying in high stratus overcasts with plenty of visual space underneath. Don't try those letdowns through a 500-foot ceiling or in a snowstorm until you have acquired a thorough understanding of procedures and developed a high degree of skill in the necessary techniques.

It is possible to fly through rough weather in your fighter. But here again you should first gain confidence in your instrument ability by practice in weather you can handle. Stay away from thunderstorms, icing conditions, severe turbulence or precipitation until you are proficient—and then be prudent.

From takeoff to landing, each fighter pilot is his own General, with a hundred pushbuttons and switches in his airborne desk. Using those pushbuttons, switches, gadgets and gages to their best advantage comes only through practice and study. Procedures must be learned on the ground through use of the Link trainer, but technique must be practiced in the air with your own fighter. For ease and best results, power settings should be memorized to effect accurate climbs, turns and letdowns. A predetermined airspeed is recommended for each procedure of range work and should be calculated in miles per minute to simplify time and distance problems.

Use all the available flight instruments in the fighter and check each one carefully before takeoff and before entering the overcast. An essential part of your training, however, is to learn to fly on the rate instruments only. The inability to do so will find you in serious trouble should your gyros spill or become inoperative.

The flight instruments vary between airplanes. There are several types of altitude indicators in use, and on some the presentation given by the instrument is reversed. The turn needle in some fighters is a standard rate instrument calibrated to turn three degrees per second, or 360 degrees in two minutes. In others the needle is only a half-rate instrument, or one that will turn your fighter one and one-half degrees per second. Check carefully before takeoff to determine the type of instruments in your airplane and how they are calibrated.

Fighters as a whole are stable and will tend to fly straight and level if trimmed properly. In a stratus overcast you will be able to fly for minutes at a time without touching the controls. Such is not the case in cumulus and cumulonimbus formations where the unstable air will bounce your aircraft up and down and rock your wings. Do not get the "zoomies" when you encounter rough air, or you will find yourself horsing the stick back and forth and expending your energy for naught. Keep your attitude and airspeed within allowable limits

THERE IS NO BUGABOO TO WEATHER FLYING IN SINGLE-ENGINE FIGHTERS

and let your airplane ride out the rough stuff. Fighters have the highest rating of any aircraft in the Air Force for ability to withstand the stress and strain exerted by turbulence, but the forces created by your fighting the gusts can become excessive.

Radio procedure while undertaking weather flight is comparatively simple, yet some pilots continue to stumble their way through position reports, destination changes and weather reports because of their infrequent weather flights. The Radio Facility Chart contains the correct procedures with examples of how to report. Review it before takeoff and know where it is located in the data box, so you won't have to finger through a dozen volumes of other T. O.'s and maps. Shuffling paper in a fighter while flying weather is an unwise habit you must break by simplifying your flight planning.

Compute your ETE's between compulsory reporting points on the ground and then recheck them in the air after you have determined your actual ground speed. It is essential that you prepare yourself to make position reports before you arrive over your compulsory reporting point—keep your mind working faster than the speed of your fighter and the CAA operators on the ground will clap their hands in glee.

You must remember *YOU* are the sole occupant of the aircraft and there are no copilots, navigators or radiomen to figure a course for you. You are flying the aircraft by yourself and endeavoring to hold course on a radio range and you don't have much time to be figuring courses and gathering data after takeoff. Do most of your computations on the ground and practice your radio telephone procedure in the Link trainer. This will allow you to devote more of your time to the CAA operator and at the same time stay orientated on the range.

As a part of your flight planning, it is helpful to map out your course and list the radio range frequencies and identifications on a sheet of paper in the order in which you will pass them. A small piece of carboard about 5"x2" works well for this purpose and you can attach it to the little spring steel holder on the left leg of your flying suit. If your suit has no spring steel snap holder, have your personal equipment department sew a transparent plastic pocket on your flying suit about six inches above the knee. (Such a pocket has space for other cards such as emergency procedures.) By listing the frequencies and identifications you have eliminated another item that you would be forced to work out in the air. One fighter group has devised a means of placing all necessary navigating, operating and emergency data on a spring-loaded card over the instrument panel. The card then flips back out of the way when not in use. Possibly you can or already have thought of other methods. It is of utmost importance that you simplify every step of your flight planning on the ground as it is the very key to successful instrument flight in a single-engine fighter.

In filling out the flight clearance, be sure to request the altitude you desire to fly and the reporting points where you will advise ARTC of your position. ARTC will endeavor to approve the altitude you request but sometimes a heavy volume of air traffic forces them to assign you a different altitude. When the tower calls and asks if you are ready to copy your ARTC clearance, have in front of you the Form 23 or NME Form 175 you filed in operations. You will have verbatim (with few exceptions) exactly what the tower is about to transmit to you. As the tower operator transmits your ARTC clearance, check it against your Form 23 or NME Form 175 and frequently you will receive a clearance exactly as you have requested it. In any case you will need only to write down the changes on your clearance rather than to copy the entire clearance.

In the development of an all-weather Air Force, it is necessary for fighters, as well as bombers and transports, to fly in all types of weather. Admittedly, the fighter pilot on instruments is a busy man, but it can be done. It requires only that you are in good physical condition, acquire a thorough knowledge of procedures, develop your technique gradually, and make thorough preflight preparations. You absolutely cannot fly an aircraft in a hurry, so take your time now because you're a long time dead.

MEDICAL SAFETY

EMERGENCY PARACHUTE JUMPS

THE Directorate of Flight Safety Research has an intense interest in the development of better parachutes. In fact, the interest was active as early as 1943 when the Medical Division of Flight Safety, through the efforts of its chief, conducted many parachute jumps to test various theories and developed a training curriculum which was used throughout the Air Force Training Command in teaching cadets the problems of opening shock and how to avoid landing injuries. The wartime Chief of the Medical Division of Flight Safety Research later lost his life in an experimental jump from 42,000 feet. Colonel Melvin Boynton was attempting to discover the problems of high altitude bailout, in order that pilots, through Flight Safety publications, might be informed as to the best techniques to be used in emergencies that arose during flight.

Today, the Directorate is in a position to get detailed and specific information on all parachute jumps through the medium of the new Form 14 reporting system. One report in this system covers emergency parachute jumps. Information collected from all Air Force parachute jumps will be assembled and made available to design and development engineers, in order that the man who flies in the USAF will have the best possible equipment for his protection.

The Air Materiel Command has been deeply concerned for the last several years by the high injury and fatality rate among aircrewmen and passengers parachuting from aircraft. Information available at AMC and reports received by Flight Safety Research indicate that two definite programs seemed to be required: technical improvement of personnel parachutes, plus a detailed and careful training of passengers and aircrewmen in the use of the new equipment.

During the fiscal year 1950, several personnel parachute projects were successfully completed by AMC, enabling the procurement of approximately $6,500,000 worth of technically improved equipment. First deliveries of production items were scheduled for late August, 1950. The new assemblies are quick-donning and quick-fit, provide lower opening shock than present service equipment, plus a 40 per cent reduction in landing impact. In addition, automatic opening types for use in high speed and/or high altitude aircraft are being procured. It is believed that these improved assemblies are capable of effecting a marked decrease in the incidence of injuries and fatalities, provided a strong effort is made to educate flying personnel in their use.

The following general program to make available to the service at large all required information has therefore been established by AMC:

Technical Order 13-5-1 "Use of Free-Type Parachutes," has been completely revised and rewritten. Particular care has been taken to make this publication readable. Text has been made as simple and personal as possible, and illustrations have been used freely. This Technical Order was to be ready for distribution this month.

It is planned to bind Technical Order 13-5-1 in a heavy-duty cover, and to place one copy aboard each multi-place aircraft in the USAF. While it is realized that personnel always should be indoctrinated and briefed before flight, this additional action was undertaken for the following reasons:

(1) Regular flight crews will be brought into direct contact with the publication. It is expected that during the routine of cross-country or normal training flights the publication will be picked up and read with interest.

(2) It will provide pilots with briefing material for passengers, and passengers with reading material which may be of direct value.

(3) It will have a cumulative educational effect.

It is planned to prepare and issue simply-worded decals for installation in all multi-place USAF aircraft, calling attention to the bailout problem and the availability of the Technical Order.

In the data pocket of each parachute will be placed a light cloth or paper poster showing how to adjust and fit the particular type of harness with which the parachute is equipped, and a day chart and night chart summarizing bailout instructions for all conditions of flight.

Distribution of Technical Order 13-5-1 will place one copy in each Operations Office, and one copy in each Pilot's Information Folder.

WELL DONE

To

CAPT. HAROLD E. PLAIN
1ST LT. FREDDIE C. KIGHT
325th All-Weather Group
Continental Air Command

THE primary mission of the Air Proving Ground, Eglin Air Force Base, Florida, is the accomplishment of Operational Suitability Tests on USAF equipment. Operational Suitability testing in a nutshell means the accelerated employment of new equipment in simulated combat missions.

One of the many tests now being conducted is that of the F-94, the USAF's new shark-nosed all-weather fighter. This airplane is employed in the day, at night, and in all weather against all types of aircraft targets to determine if it will be adequate for the job the USAF has for it. It is a policy of APG, when conducting these operational suitability tests, to invite the major commands, who will utilize the equipment, to send picked operating personnel to participate in the actual testing. This serves a dual purpose, providing the APG with the current outlook of the combat commands in addition to providing early, realistic training for certain crews of these commands. Here is how a pilot-radar operator team of the Continental Air Command, Capt. Harold E. Plain and 1st Lt. Freddie C. Kight, handled a difficult situation while participating in a recent night test interception mission against a B-50 target airplane. Following normal pre-flight checks and an uneventful takeoff—but let Captain Plain tell the rest of the story . . .

"Approximately half way through a 90° climbing turn to the left, I felt the airplane lose power. A quick check of the RPM showed approximately 50 per cent and dropping fast. It was impossible to read fuel or oil pressure because the lights were dimming. I immediately called to my target airplane and the tower that I had lost power. The turn was continued until I was headed in the direction of the field. A landing strip was discovered directly underneath me but it was blacked out so I decided to head for the main base. (Takeoff was from Eglin Auxiliary No. 3, 12 miles north of Eglin Main.) Field No. 2 was lighted (eight miles northeast of Eglin Main) and I estimated I could use it, if necessary.

"A glide air speed of 185 knots was established and an automatic air start was attempted, with no success. I did not attempt a battery start because my battery was getting low and I wanted to use the radio. It was impossible to see the air speed indicator, so my radar observer called off the air speed, using his flashlight for instrument lighting. By this time, the North/South runway of Eglin Main was in sight and the tower had alerted the crash crew. At 2000 feet altitude, I knew I could make the field for at least a wheels-up landing. Glide was continued at the same rate. About three-quarters of a mile from the end of the runway, I saw I would land long, so the landing gear was lowered and gliding speed reduced. At a quarter of a mile from the end of the runway, I was still high and fast and lowered full flaps.

A normal power-off landing was accomplished about the middle of the first third of the landing runway. The airplane slowed down very nicely with the engine off and little brake was used. I turned the airplane off on the last taxi-way and stopped. My radar observer saved the Air Force one F-94, because without his help I could not have controlled my air speed without operating a flashlight, and my hands were more than full."

The trouble was caused by a malfunctioning electrical fuel shut-off valve that closed and stopped all fuel flow to the engine. A start was impossible. The valve has been U/R'ed. (U)

Rescue in the Baltic — Coastal bases of the Swedish Air Force have developed a new wrinkle to aid in search and rescue missions. A standard 4-man life raft is fastened to the bomb racks of a twin-engined light bomber and a 220-yard-long rope ¼" in diameter is trailed free just prior to release. The 30 yards of rope nearest the raft is plain—to sink and act as a drogue, but thereafter yellow cork floats, 2" long and 1" in diameter are attached every few feet to keep the line afloat.

The rope is wound on a hand-operated reel. When the search plane sights survivors, the rope is unreeled out the camera door, and the end remaining in the airplane has a ring attached to a rope made fast to one end of the raft. This ring is fastened to a snap-release hook.

The raft is placed on a metal 'chute forward of the camera door and a static line at the rear end of the raft is fastened to the plane. When the snap-release hook is pulled, the drag of the rope pulls the raft from the plane. When the raft is free of the plane the static line pulls the pins allowing the canvas cover of the raft to fall free and CO^2 bottle to inflate the raft. The raft is fully inflated when it strikes the water.

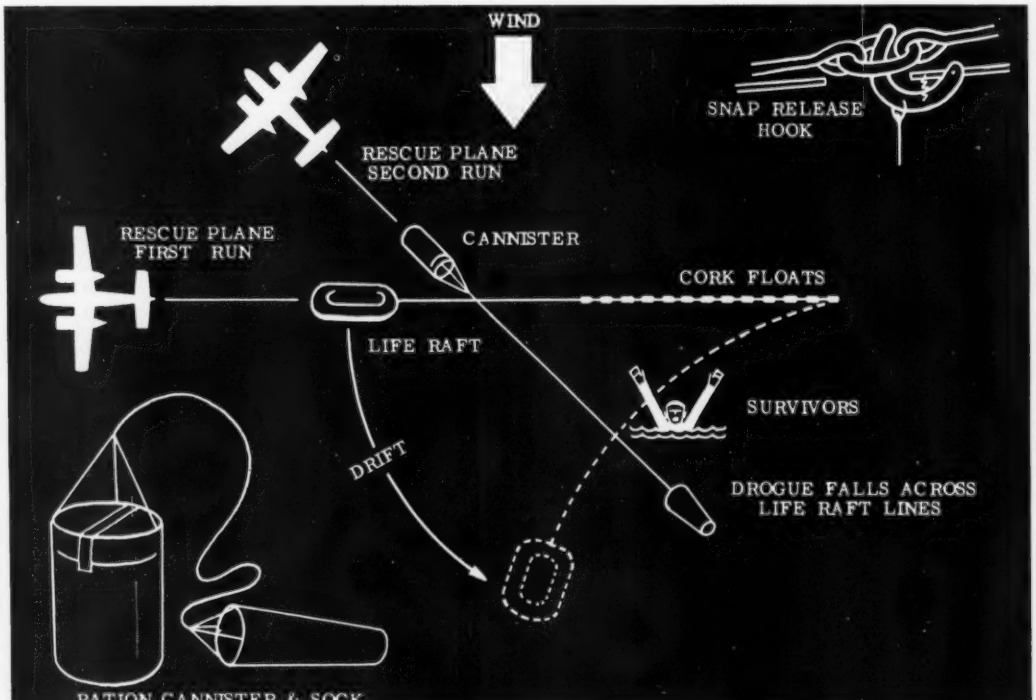
Following the dropping of the raft, a second pass is made and a "windsock" type of drag is dropped, trailing 80 yards of braided cotton line coated with a brightly colored plastic paint. This line is attached to a canister 18" high and 10" in diameter, made of fiber coated with plastic. This canister contains the normal survival equipment of the raft, but is dropped separately in order to avoid impact damage to the raft. The plastic coating makes the line and drag float.

The dropping technique used is as follows:

The plane flies cross-wind, up-wind from the survivors, and releases the raft while flying at 100 feet and at its slowest speed. The rope trails out and the wind drifts some part of the rope to the survivors. In case of a miss, the entire rope acts as a drogue, showing the drift of the raft, giving the survivors a better chance to catch it. The rope with the canister is dropped to cross the raft rope, thus making it easier to obtain.

Experiments have shown that a "sock" type drogue or cork floats are necessary as a free falling rope when released bunches into a tangle near the raft and is useless. (U)

CAPT. CHARLES S. RICE, USAF
Assistant Air Attache
Stockholm, Sweden



✶ Cross Feed

FLYING SAFETY IDEA EXCHANGE

Self-Preservation—The USAF Flying Safety Program is presently a major item in the over-all Air Force picture. For the obvious reasons of saving lives, money, much needed aircraft and of avoiding unfavorable publicity.

Much is heard, and a tremendous amount of publicity given to the facts stated above. Bulletins picture an F-51 smashed and almost disintegrated as the result of buzzing a home town; or a B-26 spread over a few acres of mountainside because a pilot preferred trying to stay VFR under IFR conditions. You'll find the type aircraft, weather conditions, terrain features, extenuating circumstances and other pertinent data listed in these accident reports. They're very thorough and detailed in describing HOW the accident occurred. The one thing I look for and seldom find is the psychological reasoning behind some of the pilot error accidents due to substandard thinking.

Aside from a pilots understandable aversion to the effects of administrative action resulting from a violation or pilot error aircraft accident, what has become of the age-old self-preservation instinct?

An air safety bulletin signed by St. Christopher couldn't make me more conscious of safe flying procedures than my personal desire to keep myself in one piece.

The pilot who would plan a three-hour flight with 3 hours 10 minutes fuel on board can be categorized with the worst type moron whose favorite, and often last, words are, "I think I can make it." Although I don't have too much pity for this type when his fate catches up with him, I certainly do worry about the poor innocents who may be riding with him. The thing that really worries me is that one of his passengers may some day be *me*.

Possibly these pilots don't read the warnings and helpful suggestions compiled from past accidents, in which certain pilots learned the hard way. Or maybe, they just plain figure, it can't happen to them. If anyone can possibly fathom a man trading his career, future and even his life for a thrill or a short cut, how about explaining it?

The safety publications are disseminated for one reason—to help you benefit from other's errors and experiences. So read them and heed them, and the life you save probably will be your own. (U)

CAPT. L. M. TANNENBAUM
Flying Safety Officer
Pacific Division, MATS

* * *

Helping Hand—En route to the mainland from Ramey AFB, Puerto Rico, a C-54 crew radioed "Have sighted what we believe is either an oil slick or yellow sea marker while on course 90 miles WNW of Ramey."

Air Rescue Service's flight at Ramey, Flight C, 1st Air Rescue Squadron, alerted by base operations had a plane ready to dispatch to investigate.

Then, a second message came in. This time, a C-47 en route from Ramey to MacDill was returning to Ramey on one engine. Its position was given as 45 minutes WNW of Ramey on course.

The Rescue plane was airborne seven minutes after the alert on the C-47 was received. The SB-17, with its droppable lifeboat fitting snug to the fuselage, was piloted by 1st Lt. Eugene E. Rice. The disabled C-47 was intercepted 10 minutes later, and escorted until it had landed safely at Ramey.

Then pilot Rice wheeled his four-engine rescue plane around, toward the oil slick or sea marker site. While all crew members looked in vain, the plane twice flew over the entire area, without making any sightings. The search was called off, after all planes and ships in the area had been accounted for.

In all it was a fairly routine day for the men at "Ramey Rescue." But some of them are still wondering just what kind of a guy would fly over the ocean, see an indication of trouble, radio it in, and then continue on course at 8500 feet, without taking a few minutes to drop down to low level for a good look-see and perhaps even give up one or two of his life vests or life rafts to someone in trouble?

That ETA must have been very important. (U)

MAJ. WALTER F. DERCK
Operations and Training Officer
Air Rescue Service

PHOTOGRAPHS COURTESY OF UNITED AIR LINES

SENSITIVE FINGER

AIRLINE OPERATIONS CENTER KEEPS VIGIL ON WEATHER'S CONSTANTLY CHANGING PULSE

WEATHER more than any other factor, affects scheduled airline operations because it's the arrival time that counts, not the departure time.

And with some 40 meteorologists of United Air Lines working continuously at analysis of weather data, a "weather consciousness" atmosphere pervades the airline from the offices of company VIP's to the pilots in cockpits somewhere along the 10,700 miles of United's route. Located at strategic dispatch centers, the dispatcher and meteorologist analyze accumulative weather reports and issue a forecast for each specific trip. This is done several hours before the scheduled departure of each flight.

Following this weather study, and about an hour before the plane's departure, flight officers for the trip meet in United's airport operations offices to prepare a flight plan—after another study and discussion of the weather and operating plan for their route with the dispatcher. Joint responsibility for clearing the flight according to the minimum standards established by the company and the CAA, is shared by the captain and the flight dispatcher.

Airline pilots and flight dispatchers, in making this thorough analysis of weather conditions, include a careful study of the latest hourly weather reports from hundreds of weather stations in the United States and Canada, a series of maps of the current distribution of ground and air weather conditions along the flight route, and United States Weather Bureau and United's own forecasts of expected developments over the entire airway.

With agreement that weather conditions are favorable for the trip, the flight plan is completed by the pilot. A flight plan is also filed with the local air traffic control offices of the CAA. The officials of United believe this "weather consciousness" makes for greater schedule dependability, particularly during the winter months. For instrument landing approaches, United pilots use ILS, monitored at some fields by GCA.

Within a centralized operations control and passenger service set up at Stapleton Field, Denver, Colorado, upwards of 300 tacticians daily handle hundreds of weather bulletins and operational messages. The control center taps phone and teletype networks carrying three million messages a month. Under the watchful eyes of this operating base at Denver are all of the flight operations, ground services and engineering maintenance facilities along the sprawling coast-to-coast route of the main airway. Because the action is so smooth and fast, the Denver base has become a showpiece of aviation.

Figuratively, the heart and soul of this operations center which keeps such a sensitive finger on the weather's changing pulse, is the "Operations Control Room," which, with round-the-clock vigilance, assures the utmost efficiency in daily schedules.

The "control room" is a place where minor irregularities may be caught before they become major by repetition, and quirks may be ironed out in conference; where the daily problems of running an airline can be brought into quick focus for quick solution; where accident trends are carefully watched.

Dominated by a huge United States Airways chart on which the airline routes are laid out, the room also contains charts and compilations of figures on what the company has been doing, how this has been accomplished and what performance is expected. Other charts include ground accidents to aircraft, weekly and monthly aircraft performance.

An outstanding feature of the room is a series

of colored lights representing 19 key stations on the wall-size airways chart and controlled from a switch panel at the rear of the room. Red and white lights, flashing or steady, tell of weather conditions or air traffic control delays, and immediately locate points where delays or canceled operations may be expected.

The room is kept in continuous contact with the entire UAL system through private line phones and a special teletype machine which uses a roll of paper every 24 hours. Reports coming in on the machine are condensed and correlated for the daily briefing session. Information presented at each briefing is the latest available—and still later information has occasionally been brought in during the meeting, to correct or add to earlier reports.

In a typical daily briefing session—or "chapel," as some of the regular attenders call it, the manager of weather service moves up by the weather charts, points to yesterday's 24-hour forecast and tells briefly what the weather was supposed to do. He then moves his pointer up to another chart and analyzes what actually occurred. Similarly, pilots throughout the system each day check their own and official forecasts with weather actually encountered on their flights, which contributes greatly to their ability to size up unpredicted situations.

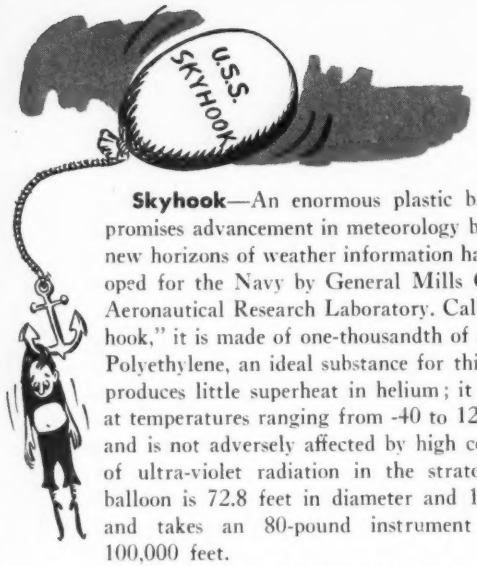
The charts, with a system of signal blocks for each major station, show by colors the weather at each station and, roughly, for the surrounding area. These are not unlike the presentation used in military Flight Service Centers. Signals are for six-hour periods and may be split horizontally for changes within the periods or vertically to show fluctuating weather. Red denotes sub-marginal weather, amber, marginal; and green, normal.

Proof that this careful attention to weather and other flight details is paying off is the fact that 97 per cent of the airline's scheduled flights are getting through the weather and 74 per cent arrive on time, or nearly so.

Although commercial airline operations as compared with USAF differ widely, the Air Force pilot should take a good tip from his airline brother pilot be "weather conscious" when planning a flight, and fly the plan.

It will pay off in safety.

1. **"CHAPEL" MEETING**—UAL executives meet daily in the Denver "chapel" for a briefing on scheduled operations of yesterday, today and tomorrow.
2. **GETTING THE WEATHER**—Two UAL pilots get the very latest and most meticulous word on the weather before filling out their clearance.
3. **DOUBLE CHECK**—A final check is made with the airline dispatcher, who checks the flight plan and weather with the pilots. The dispatcher is one of the key men in airline operations and his word carries weight with the pilots.



Skyhook—An enormous plastic balloon which promises advancement in meteorology by opening up new horizons of weather information has been developed for the Navy by General Mills Corporation's Aeronautical Research Laboratory. Called the "Skyhook," it is made of one-thousandth of an inch thick Polyethylene, an ideal substance for this purpose. It produces little superheat in helium; it handles well at temperatures ranging from -40 to 120 degrees F., and is not adversely affected by high concentrations of ultra-violet radiation in the stratosphere. The balloon is 72.8 feet in diameter and 129 feet long and takes an 80-pound instrument payload to 100,000 feet.

Several Skyhook balloons have been released from Navy ships at sea, and hundreds of flights have been flown over the United States for leading scientific institutions. Much new information on winds at 100,000 feet has been gathered. Flying the large cells requires special facilities, and within the United States must have approval of the Civil Aeronautics Administration.

* * *

Filing Messages—pilots filing clearances or arrivals with the CAA communications system for relay to Flight Service on CAA Schedule "B" should not file such clearances or arrivals with CAA *towers*. Messages should be filed with the *radio range station*. Upon takeoff, either IFR or VFR, the actual time off the ground should be immediately given to the nearest CAA radio range station for transmission to Flight Service.

The Worm Turns—With bugs already squirmingly entrenched in their wormholes, the biggest bug spraying operation in history is under way in the Northwest woods. More than 100 airplanes are used in DDT strafing attacks on spruce budworms which threaten some 900,000 acres of timberland. New runways near the woods were built to facilitate the all-out million-dollar war on the bugs.

KEEPIN UR

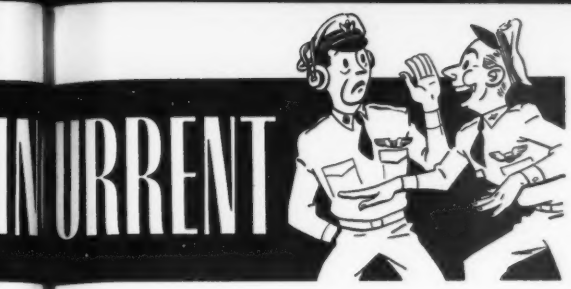
Disturbing Note — Along with the one hoss shay, flight engineers may become obsolete in the day of the jetliner age. With only one control knob per engine, Britain's Comet, the Vickers Viscount (a turbo-prop), and Canada's Jetline all have two-man operating crews, plus radio officer and navigator.

Case of The Vanishing Runways—A solvent resistant rubber compound developed by a U. S. rubber company may solve the problem of protecting airfield runways from fuel spilled by jets. When mixed with tar, the new compound makes a tough, lasting surface that resists the dissolving effects of kerosene type fuels. Damage caused to bituminous pavement by the leakage of jet type fuel is a growing problem in maintenance and construction since jet fuel has a low evaporation rate and repeated spillage acts progressivley to cause further disintegration of the runway surface.

* * *

Fine Print Department — A new CAA wall chart measuring 20 by 30 inches lists state aviation laws. Information is given on laws as of 1 March 1950, and the new chart carries 155 explanatory footnotes on the reverse side.

New Altitude Record—A woman, Ana Louisa Branger of Washington, D. C., has established a new light plane altitude record of 24,504 feet. Her Cup Special, powered by a Continental C-90-8F engine, was equipped with a fixed pitch propeller of special design.



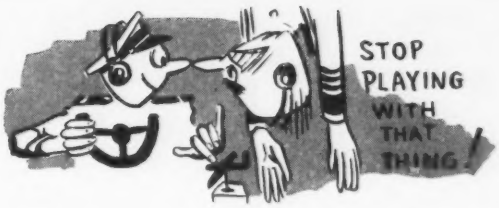
15-Cylinder Economy—Rated at 3250 horsepower, a newly developed Wright Aero Turbo-Cyclone compound engine has 18 cylinders, but because of the compound feature, the power developed is equivalent to a 21-cylinder engine while the fuel consumption is that of a present-day standard of 15-cylinders.

Super Suit—AMC has developed a new fire-fighting suit that can withstand heat from a 1,500 degree fire at two feet with the wearer's body temperature rising only one degree. The suit is made of aluminum foil laminated to a smooth cloth base and the suit reflects 99 per cent of all heat rays.

Desert Wind Tunnel—The new X-4 swept-wing planes are designed to explore the high-velocity band just under the speed of sound. Powered with two gas turbine engines, they will be able to make flights of comparatively long duration at high subsonic velocity, using the skies above the California desert as a huge outdoor wind tunnel. Ordinary wind tunnels capable of testing a large model at sonic speeds are not presently available. Instead of blowing air past a large model in a tunnel, the X-4's will fly through free air at the desired speeds while their elaborate instruments record the information needed.

* * *

Spit 'N Polish Department — The 2156th ARS, MacDill AFB, Florida, has requested 30 new nickel-plated Hamilton prop blades from AMC for testing in conjunction with amphibious training. The new nickel-plated props are believed to be erosion-resistant and will be tested on the Grumman SA-16.



Trim Tab—A distinct feature of the Navy new turbo-prop XP5Y-1 patrol plane is the trim tab arrangement in the cockpit. On the pedestal between the pilot and the copilot is a miniature plane; by moving it in the desired direction the control surfaces can be trimmed.

* * *

Super Cub—The new Piper 105 can take off in five times its own length. Powered with a 155 hp engine and equipped with special flaps it can fly at 30 mph.

* * *

'Copter Servo — After one year of successful experimentation on the Sikorsky S-51 model helicopter, the company's fingertip cyclic pitch control system (sometimes known as the servo unit or booster control) is being installed on all production helicopters of the S-55, H-1A and H04S-1 models. Adapted from fixed-wing formulas, the hydraulic servo has been installed in order to eliminate bothersome stick forces, which had always been troublesome for pilots on long helicopter flights. Before such installation, 'copter pilots had to struggle with bad weather and gusts in order to control the pure mechanics of rotor blades and the machinery regulating them.

* * *

Briefly Noted — Produced by Bofors, Sweden has a new AA gun capable of firing over 70 rounds a minute to an altitude of over 35,000 feet . . . Turbojet engine manufacturers unanimously favor kerosene type fuel for civil air transport use. Such fuels give 10 per cent more air miles and cost less per gallon. The Army has announced a new ground-launched rocket capable of reaching 60,000 feet altitude to destroy an enemy aircraft. For joint United States-Canadian defense, Canada is buying 100 F-86's, and is sending RCAF pilots to the United States for training in the Sabre. Pan American recently made the 10,000th landing, using GCA at Gander. The GCA unit was set up four years ago . . . The 10th Rescue Squadron of the Alaskan Air Command has been transferred to USAF's Air Rescue Service.

VISIBILITY FORECASTS

ALL pilots being briefed for flights through adverse weather conditions, particularly when fog and/or precipitation are forecast, should know: *A visibility value reported with the weather observation is not necessarily that which the pilot will encounter while making an approach for landing.* A reported visibility of ¼ mile, for example, means that to a stationary observer on the ground, the *horizontal* visibility is ¼ mile. In cases where fog and/or precipitation is present, a pilot will seldom be able to see that far from an aircraft about to land, for the line of sight in which he is interested is not horizontal, but air-to-ground-slant range. (Also, precipitation on windshields cuts down the distance visible.) Inexperienced pilots in particular expect the visibility being reported by the weather station to coincide with the distance they will be able to see while on final approach. This misinterpretation should be corrected by the forecaster. (U)

—AIR WEATHER SERVICE

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VFR IN IFR WEATHER

FEDERAL Airways officials have become concerned over the hazards involved in the present practice of some pilots who cancel IFR flight plans and attempt to proceed VFR in marginal weather.

A recent regional survey on this subject indicates that, generally, this practice is not prevalent. However, information has been received which indicates that some pilots apparently make a practice of canceling their IFR flight plan upon approaching the terminal area and attempting to proceed VFR under adverse weather conditions. Equally unprofessional, some pilots cancel their IFR flight plan prior to departure and then request an IFR clearance a short distance from the terminal area, despite the fact that it was almost certain at the time of departure that VFR flight would not be possible.

It is not necessary to describe the unnecessary delays to other aircraft which often occur, and the potential hazards of such practices, particularly in terminal areas.

FLYING SAFETY

DEPARTMENT OF THE AIR FORCE

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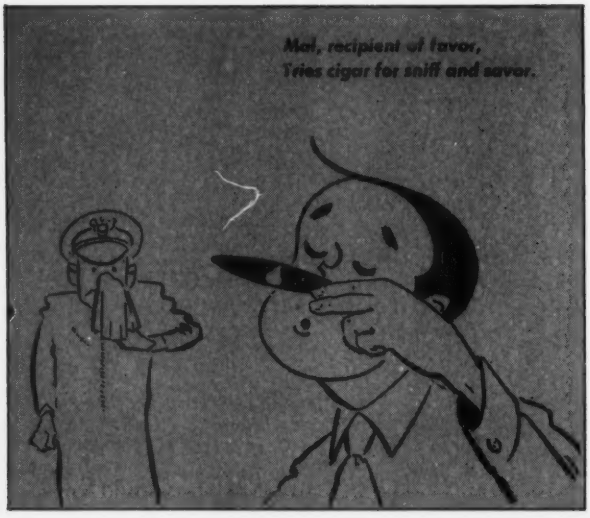
WHY?

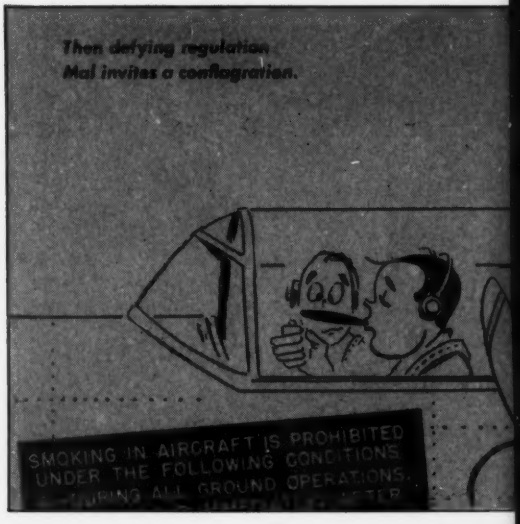
THIS F-51 had just been inspected and the pilot had it up on a test flight. After 30 minutes, he was cleared to land and during the go-around, he notified the tower that the landing gear lights indicated unsafe. Further checking and a flight past the tower showed the left gear apparently had jammed halfway down. The pilot attempted to release the hydraulic pressure and tried to raise the gear, but nothing moved. Then he tried forceful air maneuvers at various speeds—pulling a maximum of 6 G's. When this didn't free the gear, he flew along the runway, bouncing the right wheel on the paving, without success. Finally, the pilot elected to bail out, which he did successfully. When the wreckage was inspected, a wrench was found lodged in the left gear actuating mechanism.

Mal Function

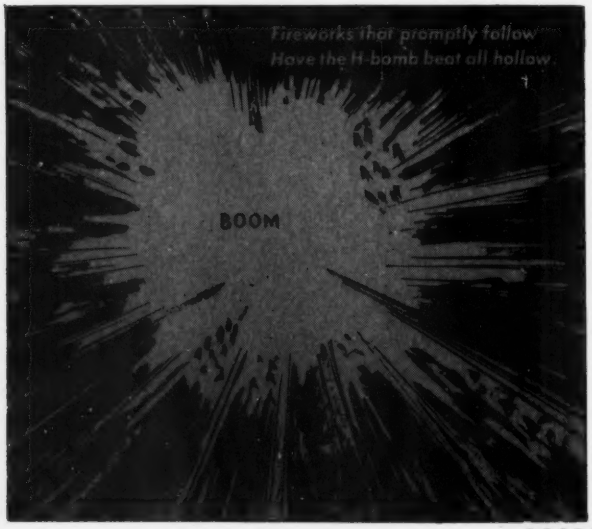
Brand new Captain puffs up chest,
Passes out cigars with zest.



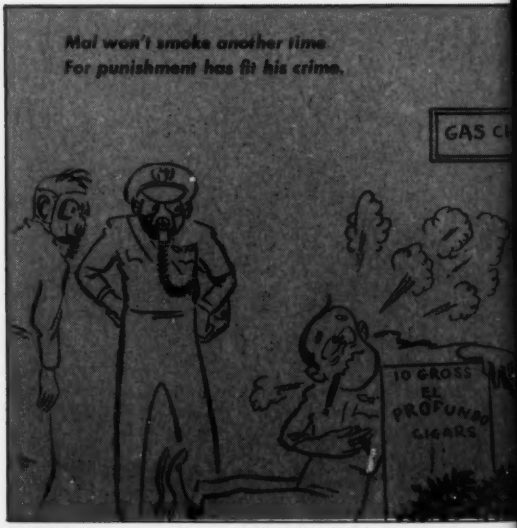
Mal, recipient of favor,
Tries cigar for sniff and savor.



Then defying regulation
Mal invites a conflagration.



Fireworks that promptly follow
Have the H-bomb beat all hollow.



Mal won't smoke another time
For punishment has fit his crime.

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